Sn on InSb(100): a Surface Photoemission Study

E. Magnano (Laboratorio TASC-INFM, Italy), S. Gardonio, M.G. Betti (Universita' La Sapienza, Italy), B. Allieri (Universita' di Brescia, Italy), E. Vescovo, I. Baek (NSLS),C. Mariani (Universita' di Modena e Reggio Emilia, Italy), and M. Sancrotti (Laboratorio TASC-INFM, Trieste, Italy and Universita' Cattolica di Brescia, Italy)

Abstract No. Magn6710
Beamline(s): **U5UA**

Introduction: Heterojunction between narrow bandgap semiconductors, such as InSb (0.18 eV), and zero-gap semiconductor (α -Sn) have attracted a lot of attention because of their potential application in infrared sensors and high speed optoelectronic devices. Furthermore it is very well known that the heteroepitaxial growth is favored by the good surface lattice matching between α -Sn and InSb, but a detailed understanding of the electronic properties and of the compositional stoichiometry of these systems is still lacking.

Methods and Materials: At this purpose, samples of different thickness were deposited at RT on an In-rich surface of InSb(100)–*c*(8x2) and investigated by means of Synchrotron X-ray Photoelectron Spectroscopy (SXPS) and Low Energy Electron Diffraction (LEED). Films of Sn grown by keeping the substrate at selected temperatures (300 K (RT) and 100K) were studied and compared.

Results: The samples show a LEED pattern typical of double domains of a (2x1) superstructure. The deposition at low T corresponds to a metallic system with a clear Fermi edge. In contrast, deposition at RT or systems deposited at 100 K and then annealed up to RT display a valence band structure typical of a semimetal. Segregation of In at the topmost layer is always observed, this being typically lower than 3%. At selected values of T and coverage, analysis of the spectroscopic markers point toward the presence of agglomerated islands of □-Sn. Data analysis is still in progress along with Scanning Auger measurements.